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Stockpile Report to the Congress

October 1979 - March 1980

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federal emergency management agency

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...The United States aims toward

achieving a sufficient stockpile of

strategic and critical materials...

—President Jimmy Carter

Decision Memorandum
September 27, 1977

FEDERAL EMERGENCY MANAGEMENT AGENCY

Washington, D.C. 20472

July 31, 1980

Honorable Walter F. Mondale
President of the Senate

Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives

Sirs:

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be stockpiled in the interest of national defense to preclude a costly and dangerous dependence upon foreign sources of supply in times of national emergency.

The President assigned stockpiling activities to the Director of the Federal Emergency Management Agency. The Office of Plans and Preparedness in the Agency is established to carry out the mandate of the Stock Piling Act. This Stockpile Report to the Congress for October 1979-March 1980, together with a statistical supplement under separate cover, is submitted in accordance with Section 11 of the Act.

Sincerely yours,

John W. Macy, Jr.
Director

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HIGHLIGHTS

- Strategic and Critical Materials Transaction Authorization Act of 1979 approved:

  $237 million authorized for acquisition of stockpile materials.

  Disposals authorized:

  (1) 35,000 long tons of tin; and

  (2) 3 million carats of industrial diamond stones.

  5,000 long tons of tin authorized for disposal may be contributed to the Tin Buffer Stock.

- President Carter released stockpiled chrysotile asbestos to the Department of Defense.

- New stockpile goals transmitted to the Congress.

TABLE 1

NATIONAL DEFENSE STOCKPILE INVENTORY

March 31, 1980

	Acquisition Cost	Market Value[1]
Reserved for Goals	$2,202,204,408	$7,204,432,507
Excess Above Goals	1,385,736,480	6,471,030,858
Total	$3,587,940,888	$13,675,463,365

[1] Market values are prices at which comparable materials are being traded, or in the absence of trading, values are estimates. They do not necessarily reflect the amount that would be realized at time of sale.

CONTINUING ACTIVITIES

The Stock Piling Act provides that a stock of strategic and critical materials be held to decrease dependence upon foreign sources in times of emergency. The provisions of the Act and the planning guidance announced by President Carter October 1, 1977, are the authorities for administering the program. Executive Order 12155 vests the primary responsibility for the stockpile program in the Director of the Federal Emergency Management Agency (FEMA). Within FEMA the Office of Plans and Preparedness has been assigned stockpile activities.

The Act and the President's guidance provide for a National Defense Stockpile sufficient to cover U.S. needs during the first three years of a major war. It is assumed that significant austerity measures will be in place and that priority will be given to meeting the requirements for the first planning year. Using these guidelines, stockpile goals are calculated. The goals are the difference between estimated supply and requirements for each strategic material.

The goals announced in October 1976 remained in effect during the October 1979 - March 1980 period covered by this report. Therefore, references to goals in this report refer to the 1976 goals. New goals were transmitted to the Congress on March 10, 1980, and publicly announced May 2, 1980. As a convenience, appendix 3 contains the press release which announced the 1980 goals and includes tables listing these goals.

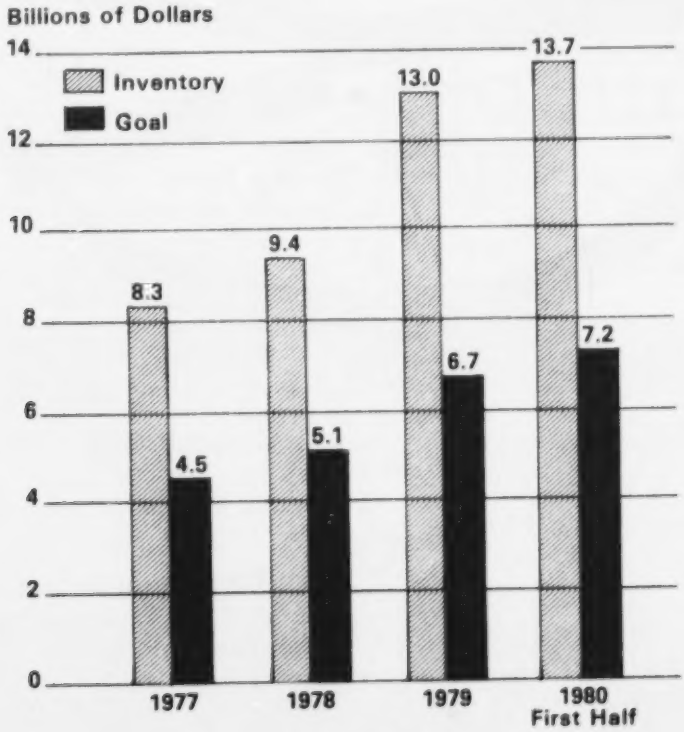

Figure 1
Relationship of Materials Held in Inventory to Materials Held for Goals by Fiscal Year

When the stockpile inventory is compared against the 1976 goals, it is obvious that the stockpile is out of balance. Most of the materials now in inventory were acquired in the 1950's so major restructuring is necessary to update the stockpile. The March 31, 1980, value of the stockpile materials was $13.7 billion of which materials valued at $7.2 billion were reserved for goals.

As shown in the figure below, the 62 family groups and individual materials in the stockpile can be divided into three categories:

(1) 21 groups and individual materials with inventory equal to or greater than the goals.

(2) 4 groups and individual materials with inventory equal to goals by crediting.

> "Crediting" involves pledging excesses available in other forms of the same material to the goal of the original material. Excesses used in crediting will not be sold even if disposal authority exists.

(3) 37 groups and individual materials with inventory less than the goal. Of these, 14 goals are over 50 percent filled.

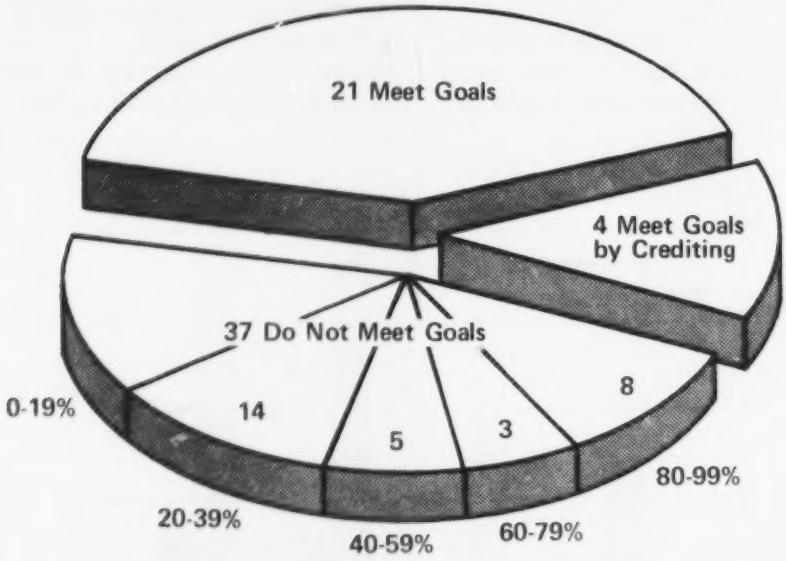

Figure 2

Status of 62 Family Groups and Individual Materials in Stockpile Inventory Toward Meeting 1976 Goals.

Annual Materials Plan

Presidential guidance includes a planning process for restructuring the stockpile through the Annual Materials Plan (AMP). The AMP is a list of stockpile materials for acquisition and disposal developed each year through an interagency committee chaired by FEMA. The agencies represented on the Annual Materials Plan Steering Committee are the Departments of Defense, Commerce, the Interior, State, Treasury, the Central Intelligence Agency and the General Services Administration.

The AMP process begins when the National Defense Stockpile Policy Division of FEMA gives a list of goals, deficits, excesses, and priorities to the Federal Property Resources Service, GSA. The materials proposed for

purchase and/or sale are ranked according to defense need priority. The GSA assesses the market for these materials and determines the quantities that could be bought and/or sold without market disruption. After these market constraints are added, the list is given to the AMP subcommittees for review.

The Strategic Implications Subcommittee, chaired by the Department of Defense, determines if the materials will be affected by changes in defense requirements. The International Economic and Political Impacts Subcommittee, chaired by the Department of State, determines the impact of AMP proposals on international producers, trade agreements, and foreign producer countries. The Market Impact Subcommittee, chaired by the Department of Commerce, examines the effect on commodity markets and develops the market impact statements. The Economic and Budgetary Impact Subcommittee, chaired by FEMA, examines the revenue and cost projections of the AMP proposal.

After the recommendations from the subcommittees have been incorporated, the AMP is reviewed by all member agencies. Upon inclusion of approved revisions, the Director of FEMA submits the AMP to the National Security Council and simultaneously provides a copy to the Office of Management and Budget. Any further revisions are made jointly by the National Security Council, the Office of Management and Budget, and the Federal Emergency Management Agency.

During the report period, October 1979 through March 1980, the FY 1981 AMP was being developed. Market assessments for the materials to be included were completed by the Federal Property Resources Service, GSA, and the proposed list of materials was presented to the Steering Committee members for review. The International Economic and Political Impacts Subcommittee found the proposed list satisfactory, but cautioned that some tight market situations would require careful monitoring to avoid disruption. The Market Impact Subcommittee approved market impact statements for the materials proposed in the FY 1981 Plan. These impact statements were prepared by Department of Commerce analysts and coordinated with agencies represented on the subcommittee. At the close of the report period, the FY 1981 Annual Materials Plan was undergoing final review prior to transmittal to the National Security Council.

Some of the 35,000 tons of stockpiled tin authorized for disposal.

Legislation

The Strategic and Critical Materials Transaction Authorization Act of 1979 (Public Law 96-175) was signed by President Carter on December 29, 1979. This act authorizes the disposal of 35,000 long tons of tin and 3 million carats of industrial diamond stones. These materials were recommended for disposal in the FY 1980 Annual Materials Plan. It is projected that these quantities will be offered for sale over a 3-year period of time. A contribution of up to 5,000 long tons of tin to the Tin Buffer Stock is also authorized. Under the Stock Piling Act a two-step process is required before purchases can take place. First the sums for acquisition must be authorized, and secondly the funds must be appropriated. The Transaction Authorization Act contains authorization for the sum of $237 million for acquisition of strategic and critical materials.

Revision of Data

President Carter's planning guidance calls for a stockpile capable of supporting the United States military, industrial, and essential civilian needs for 3 years during a national emergency. It is assumed that prior industrial mobilization with attendent increased use of raw materials will occur, and that austerity measures will be in effect. This guidance also provides for a stockpile to sustain the Nation for 3 years of a war with highest priority to be given to readiness for the first war year. These guidelines are incorporated into the econometric model used to estimate stockpile goals. Because technology, military needs, and a variety of other conditions are changing, it is important to revise the data annually.

To update the econometric model, new data was furnished by the Department of Commerce. It included 1978 consumption data for 8 materials and 1978 supply data for 13 materials with projections for the years 1982 and 1984. Analysts from the Bureau of Mines, Department of the Interior, reviewed new consumption data entries for accuracy and completeness and furnished data on world production and U.S. supplies.

The Bureau of Mines publishes a series entitled "Mineral Commodity Profiles" which provides reviews of events that affect important minerals and metals. Comprehensive descriptions of industry structure, supply-demand relationships, technology, and outlooks to 1985 and 2000 are included. "Profiles" issued since October 1979 included the stockpiled materials asbestos, beryllium, bismuth, cadmium, cobalt, copper, and mica. In addition, a bureau staff study was completed on the impact of the shortage of refractory bauxite from Guyana. These publications were used as data sources for stockpile goal calculations.

The Bureau of Mines also published "Copper Availability - Domestic," an analysis of domestic copper supply availability at prices ranging from 50 cents per pound to $2 per pound. Over 70 producing mines or properties were examined. The automated data system which was developed provides for rapid reassessment of changes in economic variables or for evaluation of scenarios containing various economic or policy assumptions. Similar work is nearing completion for domestic aluminum, cobalt, and chromium supply availabilities.

As part of a continuing program on strategic and critical materials, the Departments of Commerce, the Interior, and Defense continued joint sponsorship of a National Materials Advisory Board study on the supply and demand outlook for tantalum and columbium. A report, "Supply and Use Patterns for the Platinum-Group Metals," was issued by the Board based on an earlier study. The Office of Industrial Mobilization of the Department of Commerce is studying uses of chemical grade manganese ore and battery grade manganese dioxide. Preliminary data indicate that usage of these materials has changed considerably over the years, and that changes in stockpile requirements may be needed.

Crude rubber stowed with pallet frames

Research and Development

An alternative to stockpiling of strategic and critical materials is the development of domestic sources of supply. Additions to or establishment of domestic supply make possible a decrease in the stockpile goals. Therefore, research of a scientific, technologic and/or economic nature to develop domestic production or substitutes is a continuing part of the stockpile program. Mandated under section 8 of the Stockpiling Act, government research is primarily carried on by the Departments of the Interior, Commerce and Agriculture.

Within the Department of the Interior, the Bureau of Mines in conjunction with the Geological Survey maintains resource inventories and assesses mineral land. The Geological Survey is preparing an atlas of mineral province maps of the 48 conterminous states for selected metallic and nonmetallic minerals. A mineral province is a geographic area in which known deposits of a given commodity share some common geologic features. A mineral province also includes geologically and geochemically favorable terrain that has a high potential for the discovery of new deposits. Individual atlas maps show the distribution of known mineral deposits categorized by size and type. These maps provide a summary of present and potential resource availability equally useful for the layman and the mineral specialist. The data depicted will assist in understanding issues that underlie decisions concerning present and future mineral development. A mineral province may overlap more than one area about which government decisions on land use must be made. Resource availability, for example, must be balanced against withdrawals for wilderness. Maps for the following stockpile materials have been completed: aluminum, chromium, cobalt, columbium, copper, lead, manganese, mercury, nickel, platinum, tantalum, tungsten, and zinc.

The metallurgical and mining research activities of the Bureau of Mines continue to develop substitutes for strategic and critical minerals, to improve methods and equipment for extracting commodities, and to increase the life span of critical minerals. During the report period, a process for regenerating spent chromic acid etching solutions was developed and demonstrated to industry. Recycling the used solutions would conserve chromium and reduce environmental problems resulting from disposal. Contracts have been signed to produce a larger-scale ion implantation system to demonstrate implantation of chromium ions into the surface of low-alloy steels. Using this technique will conserve chromium and other critical materials.

Beneficiation methods are being developed by the Bureau for extracting platinum-group metals from Alaskan and Northwestern U.S. deposits such as the Stillwater Complex in Montana. Laboratory research on magnets made from domestic minerals to replace high-performance platinum-cobalt magnets has made considerable progress. Methods have been developed to reduce the cobalt content and to substitute a variety of rare earth metals for the platinum.

New technology is being investigated for recovering cobalt, nickel, and copper from the complex arsenical ores from the Blackbird Mountain region in Idaho. A bureau contract was negotiated with UOP, Inc. to use its pilot plant for demonstration of the bureau-developed process to extract nickel and cobalt from domestic laterites. These ores are located in the California-Oregon region. Research is continuing on a laboratory scale for a method of recovering chromium from the process residues.

Work continues on processes to extract alumina from domestic nonbauxite raw materials such as clay, anorthosite, alunite, and dawsonite. A contract with Kaiser Engineers has resulted in economic and technical evaluations of six raw material/process technology options. The preliminary, non-site-specific design of a 25-ton-per-day pilot plant has been completed. Miniplant research and development is based on hydrochloric acid leaching of clay. Second generation extraction technology is being developed and coal and ash are being investigated as potential raw materials for alumina extraction.

The supply of natural hevea rubber and the supply of petroleum (the raw material for synthetic rubber) are dependent upon imports. The guayule plant which is native to the southwestern part of the United States produces a natural latex. The successful commercialization of the guayule plant for production of natural rubber in the United States would mean a transition from import dependence to self reliance for natural rubber and result in a substantial decrease in the stockpile goal. Under the Native Latex Commercialization and Economic Development Act of 1978, a Joint Commission on Guayule Research and Commercialization has been established under the alternating chairmanship of the Department of Agriculture and the Department of Commerce. Cost estimates for guayule rubber processing facilities are being made. Further development of guayule under this act is dependent upon funding from Congress.

Management

The stockpile management functions in section 6 of the Act were delegated by Executive Order 12155 to the Administrator of General Services. The Federal Property Resources Service in the General Services Administration is assigned stockpile activities. The storage, inspection, maintenance, and security of materials is assigned to the Office of Stockpile Management. Acquisitions, disposals, and market and technical analyses are conducted by the Office of Stockpile Transactions.

To further protect the health of government employees and other persons engaged in stockpile activities, the Federal Property Resources Service has enhanced its occupational health management program. Hazardous work activities which occur during the

handling, storage, and shipment of stockpile commodities are monitored in compliance with government regulatory requirements. Monitoring activities include periodic industrial hygiene surveys, occupational health training, use of personal protective equipment, and a comprehensive medical surveillance program. Occupational health operating guidelines, developed and implemented during the report period, govern stockpile activities for asbestos, vegetable tannins, and beryllium. Operating guidelines are being developed for other hazardous commodities such as radioactive materials, iodine, and mercury.

Warehouses protect many stockpile materials from the elements

Barter

The Stockpile Act encourages use of barter arrangements to acquire strategic and critical materials where practical and in the best interests of the Government. Barter arrangements, where feasible, will be formally advertised or competitively negotiated. The same findings and determinations for use of competitive or noncompetitive methods for other types of acquisitions and disposals will apply in barter transactions. A study was made during the report period to identify stockpile materials that might be acquired through barter exchanges. Government-owned grain is a possible commodity for use in barter arrangements.

Purchases

The government-owned William Langer Jewel Bearing Plant at Rolla, North Dakota, operated by the Bulova Watch Company, Inc., produces jewel bearings for the National Defense Stockpile and for defense contractors. Jewel bearings and related items ordered from the plant during the report period totaled 499,538 units. Orders from defense contractors for "related items" totaled 5,296 units and included items made from synthetic sapphire such as domed pins, plates, knife edges, vee grooves, spacers, insulators, windows, and balls. The plant operated at a profit of approximately $138,000 during the report period. A 10 percent price increase was effective September 1, 1979, to absorb increased operating costs and assist in recovering prior losses.

The Interagency Committee for Stockpile Purchase Specifications and Special Instructions, chaired by the Office of Industrial Mobilization of the Department of Commerce, approved purchase specifications for seven stockpile materials and special instructions for five materials. The Committee also received expert advice on requirements for quartz crystals from the Bureau of Mines and the Department of Defense, and is preparing recommendations for FEMA. The Department of Energy proposal to stockpile a nuclear grade of beryllium metal to meet defense program requirements was supported by committee members. A proposal to stockpile Chinese refractory bauxite was reviewed. The refractory industry reported difficulties in the use of Chinese ore at this time. If the higher quality Guyanese ore became unavailable, the purchase specifications could be revised to accommodate the Chinese ore.

Sales

Sales during the period October 1, 1979 - March 31, 1980, totaled approximately $30.3 million from the National Defense Stockpile, and $1.6 million from the Defense Production Act Inventory. Of the 22 materials authorized for sale, 14 were sold during the report period. As shown in table 2, the major sales were of tungsten ores and concentrates, industrial diamond crushing bort, muscovite mica splittings, vegetable tannins, and chrysotile asbestos (a Presidential release to the Department of Defense).

Sales of the listed materials were made for industrial use except for asbestos (a Presidential release), magnesium, and a portion of the quartz crystals which were sold for government use. Of the total tunsten ores and concentrates sold, 1,416,378 pounds were for domestic use, and 1,508,702 pounds were sold for export. At the request of the Department of Defense, all sales of natural quartz crystals were suspended on October 3, 1979, until such time as its natural quartz requirements by type, grade, quality, and quantity are determined.

A request to increase the quantity of phlogopite mica offered for sale during the current fiscal year was approved by the International Economic and Political Impacts Subcommittee since no adverse impacts should result. Madagascar, the producing country, was consulted on this proposal by the State Department, which chairs the subcommittee.

TABLE 2

DISPOSAL OF NATIONAL DEFENSE STOCKPILE MATERIALS
October 1, 1979 - March 31, 1980

Material	Unit	Quantity Sold	Value (Dollars)	Balance of Disposal Authorization Quantity
Aluminum Oxide, Fused Crude	ST	-	-	3,100
Asbestos, Amosite	ST	-	-	16,242
Asbestos, Chrysotile[1]	ST	1,000	1,493,000	-
Asbestos, Crocidolite	ST	-	-	2,384
Celestite	SDT	1,000	1,000	13,412
Diamond, Industrial Crushing Bort	KT	683,587	2,101,631	1
Diamond, Industrial Stones	KT	-	-	3,000,000
Kyanite	SDT	300	30,000	1,190
Magnesium	ST	362	763,820	0
Manganese Dioxide, Battery, Natural	SDT	6,600	625,300	119,434
Manganese Ore, Metallurgical Grade[2]	SDT	(35,401)	(1,762,186)	708,864
Mica, Muscovite Splittings	LB	1,989,707	1,727,793	559,222
Mica, Phlogopite Splittings	LB	600,000	490,575	1,257,275
Quartz Crystals	LB	36,571	476,234	1,967,456
Rare Earth Oxide	SDT	-	-	505
Talc, Block and Lump	ST	-	-	988
Talc, Ground	ST	-	-	1,089
Thorium Nitrate	LB	12,375	27,844	5,330,896
Tin	LT	-	-	35,000
Tungsten Ores and Concentrates[3]	LB W	2,802,645	22,541,292	49,392,790
Vegetable Tannin, Chestnut	LT	405	224,993	7,853
Vegetable Tannin, Quebracho	LT	2,816	1,558,740	96,554
TOTAL			$30,300,036	

[1] A Presidential release to the Department of Defense.

[2] Contract was cancelled during report period. In addition, 25,738 SDT valued at $615,440 was sold from the Defense Production Act Inventory.

[3] In addition, 122,326 LB W valued at $1,008,338 was sold from the Defense Production Act Inventory.

The Strategic and Critical Materials Transaction Authorization Act, approved December 29, 1979, authorizes the sale of 3 million carats of industrial diamond stones. These stones will be offered for sale in 500,000 carat lots beginning May 13, 1980. Similar lots will be offered by sealed-bid every 4 months, a rate that will permit the disposal of up to 3 million carats within 2 years.

Sale of 30,000 tons of tin from the stockpile was also authorized by the Transaction Authorization Act. Consultations on the proposed tin disposal program with members of the International Tin Council were held January 15-18 and concluded February 25-26, 1980. The Department of State headed delegations to these meetings, and on March 3 the General Services Administration announced a disposal program which reflects consideration of observations and suggestions advanced by members of the council. Tin is to be offered at a rate of 500 metric tons every 2 weeks, beginning on July 1, 1980. The annual rate of disposal will be about 10,000 tons, and sales will be for domestic consumption only.

Transaction Fund

The General Services Administration manages the National Defense Stockpile Transaction Fund into which all moneys from the sale of stockpile materials are placed. An automated system to monitor stockpile shipments serves the needs of management for interim data. When a sale or acquisition contract is executed, the basic information is entered in the data file. The status of all contracts is then monitored, including shipments, until notification that payment has been received. Actual moneys covered into the fund are listed, as well as outstanding billings to be collected or in dispute. This system keeps track of advance payments, interest, storage costs, and other collections.

Based on actual shipments from the National Defense Stockpile, the total moneys covered into the fund from its inception on July 30, 1979, through March 31, 1980, were $61,939,483.61. There are $14,936,860.73 in outstanding billings to be collected.

PRESIDENTIAL RELEASE

On November 5, 1979, under Section 7(a)(1) of the Strategic and Critical Materials Stock Piling Act, President Carter released 1,000 short tons of high quality chrysotile asbestos to the Department of Defense. This section grants special disposal authority to the President: "(a) materials in the stockpile may be released for use, sale, or other disposition. . .on the order of the President, at any time the President determines the release of such materials is required for purposes of the national defense. . . ." This is the first such release since the 1973 release of quinine, and the 28th release in the history of the stockpile program.

Geologic occurrences of these grades of chrysotile asbestos are rare. Zimbabwe (Rhodesia) has such asbestos, but the mine has not been operating recently. The remaining free world source in British Columbia, Canada, has reported that the vein containing this material has been depleted, and there is little likelihood that this quality will be found in other veins. The current asbestos shortage is delaying the production of some weapons subsystems including the Army Tow, Lance, Pershing, and the Navy Trident.

The original purpose for stockpiling long fiber chrysotile asbestos was for use as heat shielding and electrical insulation. These particular defense applications have diminished because substitutes have been found, but other defense applications have replaced them. The very high strength-to-weight and strength-under-high-temperature characteristics possessed by this asbestos material make it attractive to missile designers. Electrical and thermal conductivity characteristics qualify the material for use in submarines. In most of these engineering choices, substitutes result in heavy performance penalties.

Surveys and tests of the chrysotile asbestos on hand in the stockpile were undertaken by the Federal Property Resources Service, GSA. When material meeting the specifications required by the Department of Defense was verified as present in the stockpile, 1,000 short tons of this specific quality of high-grade chrysotile asbestos fiber was released. In addition, a comprehensive study of the asbestos in the stockpile was undertaken to ensure handling of this material in conformance with health, safety, and environmental regulations.

The Department of Defense and the Federal Emergency Management Agency were directed by the President to identify alternate materials, processes and designs to end our dependence on chrysotile asbestos as quickly as possible.

STOCKPILE INVENTORY

The National Defense Stockpile total inventory as given in table 3 excludes quantities that were sold but not shipped from government depots to the purchasers. In the Statistical Supplement the inventory is listed as "Total Inventory in Storage" with a separate line for "Unshipped Sales." In addition, the table 3 inventory combines stockpile and nonstockpile grade materials, while separate lines can be found for each type in the Statistical Supplement. The nonstockpile grade materials were acquired by transfer of government-owned surpluses after World War II or through Defense Production Act purchase programs. In addition, some materials were of stockpile grade when acquired, but no longer qualify because of changes in industry practices. In some cases nonstockpile grade material is temporarily credited toward goals.

Market values are prices at which comparable materials are being traded, or in the absence of trading, values are estimates. They are not necessarily the amount that would be realized if the material were sold.

For some materials where a goal deficit occurs, the excess of another material is held to offset the shortage as indicated in footnotes "a" through "i" at the end of the table. The term "offset" means allocating one form of a material for an equivalent amount of another form.

Materials are grouped by families, and a summary line for each basic family group is included to enable comparisons. The materials have been grouped in each family according to their status as raw material, semifinished products or finished products containing the same common ingredient. The values shown in the summary line for each family group are expressed in the basic unit common to all members of the group. In all but three cases this basic unit is the metal equivalent for each form. There is a different conversion factor for each form because each requires different technology and incurs different conversion losses. The factors used for converting materials and the calculation procedure are in Appendix 2.

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset: Excess	Quantity After Crediting Offset: Deficit
1. Aluminum Metal Group	**ST AL**	**6,095,849**	**3,444,064**			**2,651,785**
Alumina	ST	11,532,000	0	0	0	5,117,994[a]
Aluminum	ST	0	1,732	2.4	0[a]	0
Bauxite, Metal Grade Jamaica Type	LDT	523,000	8,858,881	334.1	0[a]	0
Bauxite, Metal Grade, Surinam Type	LDT	0	5,299,596	214.6	0[a]	0
2. Aluminum Oxide, Abrasive Grain Group	**ST**	**200,472**	**263,292**		**62,820**	
Aluminum Oxide, Abrasive Grain	ST	75,000	50,904	39.7	0	0[b]
Aluminum Oxide, Fused, Crude	ST	147,615	249,864	65.0	73,900[b]	0
3. Antimony	**ST**	**20,130**	**40,730**	**163.7**	**20,600**	**0**
4. Asbestos, Amosite	**ST**	**26,291**	**42,534**	**22.0**	**16,243**	**0**
5. Asbestos, Chrysotile	**ST**	**0**	**9,958**	**8.9**	**9,958**	**0**
6. Bauxite, Refractory	**LCT**	**2,083,000**	**174,599**	**34.0**	**0**	**1,908,401**
7. Beryllium Metal Group	**ST Be Metal**	**1,563**	**1,061**			**502**
Beryl Ore (11% BeO)	ST	0	17,987	15.8	0[c]	0
Beryllium Copper Master Alloy	ST	16,710	7,387	67.2	0	0[c]
Beryllium Metal	ST	895	229	64.1	0	502[c]
8. Bismuth	**LB**	**771,000**	**2,081,298**	**6.2**	**1,310,298**	**0**
9. Cadmium	**LB**	**24,701,000**	**6,328,729**	**20.6**	**0**	**18,372,271**
10. Castor Oil, Sebacic Acid	**LB**	**0**	**5,009,697**	**8.7**	**5,009,697**	**0**
11. Chemical and Metallurgical Chromium Group	**ST Chrome Metal**	**1,235,865**	**1,173,230**			**62,635**
Chromite, Chemical Grade Ore	SDT	734,000	242,414	15.0	0	491,586

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS (Continued)

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset: Excess	Quantity After Crediting Offset: Deficit
Chromite, Metallurgical Grade Ore	SDT	2,550,000	2,488,043	223.4	0	0[d]
Chromium, Ferro, High Carbon	ST	236,000	402,696	277.9	0[d]	0
Chromium, Ferro, Low Carbon	ST	124,000	318,892	418.1	124,317[d]	0
Chromium, Ferro, Silicon	ST	69,000	58,355	43.3	0	10,645
Chromium, Metal	ST	10,000	3,763	26.3	0	6,237
12. Chromite, Refractory Grade Ore	**SDT**	**642,000**	**391,414**	**36.9**	**0**	**250,586**
13. Cobalt	**LB Co**	**85,415,000**	**40,802,393**	**1,020.1**	**0**	**44,612,607**
14. Columbium Bearing Materials Group	**LB Cb Metal**	**2,661,350**	**2,510,549**			**150,801**
Columbium Carbide Powder	LB Cb	0	21,372	0.6	0[e]	0
Columbium Concentrates	LB Cb	3,131,000	1,780,463	29.3	0	177,438[e]
Columbium, Ferro	LB Cb	0	930,911	5.2	0[e]	0
Columbium, Metal	LB Cb	0	44,851	1.8	0[e]	0
15. Copper	**ST**	**1,299,000**	**29,048**	**61.6**	**0**	**1,269,952**
16. Cordage Fibers, Abaca	**LB**	**24,000,000**	**0**	**0**	**0**	**24,000,000**
17. Cordage Fibers, Sisal	**LB**	**114,000,000**	**0**	**0**	**0**	**114,000,000**
18. Diamond, Industrial Group	**KT**	**20,353,000**	**43,713,510**		**23,180,510**	
Diamond Dies, Small	PC	0	25,473	1.1	25,473	0
Diamond, Industrial, Crushing Bort	KT	14,974,000	23,692,782	66.1	8,718,782	0
Diamond, Industrial, Stones	KT	5,559,000	20,007,992	363.1	14,448,992	0
19. Feathers and Down	**LB**	**6,494,000**	**0**	**0**	**0**	**6,494,000**
20. Fluorspar, Acid Grade	**SDT**	**1,594,000**	**895,983**	**104.8**	**0**	**698,017**
21. Fluorspar, Metallurgical Grade	**SDT**	**1,914,000**	**411,738**	**37.5**	**0**	**1,502,262**
22. Graphite, Natural - Ceylon, Amorphous Lump	**ST**	**6,271**	**5,498**	**5.2**	**0**	**772**

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS (Continued)

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset: Excess	Quantity After Crediting Offset: Deficit
23. Graphite, Natural - Malagasy, Crystalline	**ST**	**20,472**	**17,911**	**11.9**	**0**	**2,561**
24. Graphite, Natural - Other than Ceylon and Malagasy	**ST**	**34,748**	**2,802**	**0.5**	**0**	**31,946**
25. Iodine	**LB**	**3,333,000**	**8,013,074**	**36.4**	**4,680,074**	**0**
26. Jewel Bearings	**PC**	**224,623,000**	**67,625,096**	**60.2**	**0**	**156,997,904**
27. Lead	**ST**	**865,000**	**601,051**	**601.1**	**0**	**263,949**
28. Manganese, Dioxide, Battery Grade Group	**SDT**	**31,841**	**258,089**		**226,248**	
Manganese, Battery Grade, Natural Ore	SDT	12,736	255,078	20.9	226,248[f]	0
Manganese, Battery Grade, Synthetic Dioxide	SDT	19,105	3,011	3.0	0	0[f]
29. Chemical and Metallurgical Manganese Group	**STMn Metal**	**1,423,374**	**1,974,247**		**550,873**	
Manganese Ore, Chemical Grade	SDT	247,136	221,044	18.1	0	26,092
Manganese Ore, Metallurgical Grade	SDT	2,052,000	3,379,342	183.7	1,081,744[g]	0
Manganese, Ferro, High Carbon	ST	439,000	599,764	273.1	160,762	0
Manganese, Ferro, Low Carbon	ST	0	0	0	0	0
Manganese, Ferro, Medium Carbon	ST	99,000	28,920	22.0	0	0[g]
Manganese, Ferro, Silicon	ST	81,000	23,574	11.6	0	0[g]
Manganese Metal, Electrolytic	ST	15,000	14,172	17.6	0	0[g]
30. Mercury	**FL**	**54,004**	**191,391**	**75.6**	**137,387**	**0**
31. Mica, Muscovite Block, Stained and Better	**LB**	**6,188,000**	**5,203,930**	**26.1**	**0**	**984,070**

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS (Continued)

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset: Excess	Quantity After Crediting Offset: Deficit
32. Mica, Muscovite Film, First and Second Qualities	LB	90,000	1,270,845	15.2	1,180,845	0
33. Mica, Muscovite Splittings	LB	12,631,000	19,580,866	39.2	6,949,866	0
34. Mica, Phlogopite Block	LB	206,064	130,745	.15	0	75,319
35. Mica, Phlogopite Splittings	LB	932,000	2,217,898	4.4	1,285,898	0
36. Molybdenum Group	LB Mo	0	0		0	0
Molybdenum Disulphide	LB Mo	0	0	0	0	0
Molybdenum, Ferro	LB Mo	0	0	0	0	0
37. Nickel	ST Ni+Co	204,335	0	0	0	204,335
38. Opium Group	AMA LB	75,000	71,303			3,697
Opium, Gum	AMA LB	0	31,795	8.7	0[h]	0
Opium, Salt	AMA LB	75,000	39,508	28.7	0	3,697[h]
39. Platinum Group Metals, Iridium	TrOz	97,761	16,990	6.8	0	80,771
40. Platinum Group Metals, Palladium	TrOz	2,450,000	1,255,003	282.4	0	1,194,997
41. Platinum Group Metals, Platinum	TrOz	1,314,000	452,640	190.1	0	861,360
42. Pyrethrum	LB	377,851	0	0	0	377,851
43. Quartz Crystals	LB	0	2,423,036	14.5	2,423,036	0
44. Quinidine	AvOz	6,841,000	1,800,343	7.8	0	5,040,657
45. Quinine	AvOz	3,045,000	3,246,164	10.9	201,164	0
46. Rubber	LT	513,134	119,207	198.3	0	393,927

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS (Continued)

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset: Excess	Quantity After Crediting Offset: Deficit
47. Rutile	SDT	173,928	39,186	12.7	0	134,742
48. Sapphire and Ruby	KT	0	16,305,502	0.2	16,305,502	0
49. Shellac	LB	8,529,000	0	0	0	8,529,000
50. Silicon Carbide, Crude	ST	306,628	80,537	36.2	0	226,091
51. Silver (Fine)	TrOz	0	139,500,000	1,953.0	139,500,000	0
52. Talc, Steatite Block and Lump	ST	104	1,092	0.4	988	0
53. Tantalum Bearing Materials Group	LB Ta Metal	7,159,339	2,392,072			4,767,267
Tantalum Carbide Powder	LB Ta	889,000	28,688	5.0	0	860,312
Tantalum Metal	LB Ta	1,650,000	201,133	40.2	0	1,448,867
Tantalum Minerals	LB Ta	5,452,000	2,551,446	334.9	0	2,900,554
54. Thorium Nitrate	LB	1,800,000	7,146,327	19.7	5,346,327	0
55. Tin	LT	32,499	200,477	3,798.8	167,978	0
56. Titanium Sponge	ST	131,503	32,331	246.9	0	99,172
57. Tungsten Bearing Materials Group	LB W Metal	41,412,936	82,515,773		41,102,837	
Tungsten Carbide Powder	LB W	12,845,000	2,032,942	29.7	0	0[i]
Tungsten, Ferro	LB W	17,769,000	2,025,361	24.7	0	0[i]
Tungsten, Metal Powder	LB W	3,290,000	1,898,911	24.4	0	0[i]
Tungsten Ores and Concentrates	LB W	8,823,000	89,952,484	774.5	49,337,477[i]	0
58. Vanadium Group	ST V Metal	12,671	541			12,130
Vanadium, Ferro	ST V	10,095	0	0	0	10,095
Vanadium Pentoxide	ST V	2,576	541	5.9	0	2,035

TABLE 3

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS (Continued)

March 31, 1980

Commodity	Unit	Goal (1976)	Inventory	Value of Inventory (Millions of Dollars)	Quantity After Crediting Offset	
					Excess	Deficit
59. Vegetable Tannin Extract, Chestnut	LT	6,942	17,210	9.5	10,268	0
60. Vegetable Tannin Extract, Quebracho	LT	37,998	145,794	80.5	107,796	0
61. Vegetable Tannin Extract, Wattle	LT	20,208	16,398	9.2	0	3,810
62. Zinc	ST	1,313,000	375,946	289.5	0	937,054

OFFSETS

All conversion and processing loss factors, where applicable, have been taken from the Office of Emergency Planning Strategic and Critical Materials Reference Data Booklet, dated November 1, 1966.

[a]8,335,881 LDT of surplus bauxite, metal grade, Jamaica type, were used to offset 3,715,219 ST of alumina shortfall. 5,299,597 LDT of surplus bauxite, metal grade, Surinam type, were used to offset an additional 2,695,444 ST of alumina shortfall. 1,733 ST of surplus aluminum metal were used to offset another 3,345 ST of alumina shortfall.

[b]28,348 ST of surplus aluminum oxide, fused, crude, were used to offset a 24,095 ST shortfall in aluminum oxide, abrasive grain.

[c]12,120 ST of surplus beryl ore (11% BeO) were used to offset 100% of the 9,323 ST shortfall of the beryllium copper master alloy. An additional 5,866 ST of surplus beryl ore were used to offset 164 ST of the beryllium metal shortfall.

[d]166,695 ST of surplus chromium, ferro, high carbon, were used to offset 416,738 SDT of the chromite, metallurgical grade ore, shortfall. Also 70,575 ST of surplus chromium, ferro, low carbon, were used to offset an additional 176,438 SDT shortfall of the chromite, metallurgical grade ore.

[e]21,372 LB of surplus columbium carbide powder were used to offset 25,144 LB of columbium concentrates shortfall. 44,851 LB of surplus columbium, metal, were used to offset 52,766 LB of columbium concentrates shortfall. 930,911 LB of surplus columbium, ferro, were used to offset 1,095,189 LB of columbium concentrates shortfall.

[f]16,094 SDT of surplus manganese, battery grade, natural ore were used to offset 16,094 SDT of manganese, battery grade, synthetic dioxide, shortfall on a 1/1 basis.

[g]140,158 SDT of surplus manganese ore, metallurgical grade, were used to offset a shortfall of 70,079 ST of manganese, ferro, medium carbon. 103,367 SDT of surplus manganese ore, metallurgical grade, were used to offset a shortfall of 57,426 ST of manganese, ferro, silicon. 2,073 SDT of surplus manganese ore, metallurgical grade, were used to offset a shortfall of 829 ST of manganese metal, electrolytic.

[h]31,795 AMA LB of surplus opium gum were used to offset 31,795 AMA LB of opium salts shortfall on a 1/1 basis.

[i]13,028,661 LB of surplus tungsten ores and concentrates were used to offset a shortfall of 10,812,167 LB of tungsten carbide powder. 17,128,938 LB of surplus tungsten ores and concentrates were used to offset a shortfall of 15,743,509 LB of tungsten, ferro. 1,634,644 LB of surplus tungsten ores and concentrates were used to offset a shortfall of 1,391,186 LB of tungsten, metal powder.

Abbreviations

AMA LB	-	Anhydrous Morphine Alkaloid (Pounds)	LCT	-	Long Calcined Ton
AvOz	-	Avoirdupois Ounce	LDT	-	Long Dry Ton
FL	-	Flask (76-Pound)	LT	-	Long Ton
KT	-	Carat	PC	-	Piece
LB	-	Pound	SDT	-	Short Dry Ton
LB Cb	-	Pounds of Contained Columbium	ST	-	Short Ton
LB Co	-	Pounds of Contained Cobalt	ST Ni+Co	-	Short Tons of Contained Nickel plus Cobalt
LB Mo	-	Pounds of Contained Molybdenum	ST V	-	Short Tons of Contained Vanadium
LB Ta	-	Pounds of Contained Tantalum	TrOz	-	Troy Ounces
LB W	-	Pounds of Contained Tungsten			

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APPENDIX I

STRATEGIC AND CRITICAL MATERIALS STOCK PILING ACT

(50 U.S.C. 98 et. seq.)

SECTION 1. This Act may be cited as the 'Strategic and Critical Materials Stock Piling Act'.

FINDINGS AND PURPOSE

SEC. 2. (a) The Congress finds that the natural resources of the United States in certain strategic and critical materials are deficient or insufficiently developed to supply the military, industrial, and essential civilian needs of the United States for national defense.

(b) It is the purpose of this Act to provide for the acquisition and retention of stocks of certain strategic and critical materials and to encourage the conservation and development of sources of such materials within the United States and thereby to decrease and to preclude, when possible, a dangerous and costly dependence by the United States upon foreign sources for supplies of such materials in times of national emergency.

MATERIALS TO BE ACQUIRED: PRESIDENTIAL AUTHORITY AND GUIDELINES

SEC. 3. (a) The President shall determine from time to time (1) which materials are strategic and critical materials for the purposes of this Act, and (2) the quality and quantity of each such material to be acquired for the purposes of this Act and the form in which each such material shall be acquired and stored. Such materials when acquired, together with the other materials described in section 4 of this Act, shall constitute and be collectively known as the National Defense Stockpile (hereinafter in this Act referred to as the 'stockpile').

(b) The President shall make the determinations required to be made under subsection (a) on the basis of the following principles:

(1) The purpose of the stockpile is to serve the interest of national defense only and is not to be used for economic or budgetary purposes.

(2) The quantities of the materials stockpiled should be sufficient to sustain the United States for a period of not less than three years in the event of a national emergency.

(c) The quantity of any material to be stockpiled under this Act, as determined under subsection (a), may not be revised unless the Committees on Armed Services of the Senate and House of Representatives are notified in writing of the proposed revision and the reasons for such revision at least thirty days before the effective date of such revision.

MATERIALS CONSTITUTING THE NATIONAL DEFENSE STOCKPILE

SEC. 4. (a) The stockpile consists of the following materials:

(1) Materials acquired under this Act and contained in the national stockpile on the day before the date of the enactment of the Strategic and Critical Materials Stock Piling Revision Act of 1979.

(2) Materials acquired under this Act on or after the date of the enactment of the Strategic and Critical Materials Stock Piling Revision Act of 1979.

(3) Materials in the supplemental stockpile established by section 104(b) of the Agricultural Trade Development and Assistance Act of 1954 (as in effect from September 21, 1959, through December 31, 1966) on the day before the date of the enactment of the Strategic and Critical Materials Stock Piling Revision Act of 1979.

(4) Materials acquired by the United States under the provisions of section 303 of the Defense Production Act of 1950 (50 U.S.C. App. 2093) and transferred to the stockpile by the President pursuant to subsection (f) of such section.

(5) Materials transferred to the United States under section 663 of the Foreign Assistance Act of 1961 (22 U.S.C. 2423) that have been determined to be strategic and critical materials for the purposes of this Act and that are allocated by the President under subsection (b) of such section for stockpiling in the stockpile.

(6) Materials acquired by the Commodity Credit Corporation and transferred to the stockpile under section 4(h) of the Commodity Credit Corporation Charter Act (15 U.S.C. 714b(h)).

(7) Materials acquired by the Commodity Credit Corporation under paragraph (2) of section 103(a) of the Act entitled 'An Act to provide for greater stability in agriculture; to augment the marketing and disposal of agricultural products; and for other purposes', approved August 28, 1954 (7 U.S.C. 1743(a)), and transferred to the stockpile under the third sentence of such section.

(8) Materials transferred to the stockpile by the President under paragraph (4) of section 103(a) of such Act of August 28, 1954.

(9) Materials transferred to the stockpile under subsection (b).

(b) Notwithstanding any other provision of law, any material that (1) is under the control of any department or agency of the United States, (2) is determined by the head of such department or agency to be excess to its needs and responsibilities, and (3) is required for the stockpile shall be transferred to the stockpile. Any such transfer shall be made without reimbursement to such department or agency, but all costs required to effect such transfer shall be paid or reimbursed from funds appropriated to carry out this Act.

AUTHORITY FOR STOCKPILE OPERATIONS

SEC. 5. (a) Except for acquisitions made under the authority of paragraph (3) or (4) of section 6(a), no funds may be obligated or appropriated for acquisition of any material under this

Act unless funds for such acquisition have been authorized by law. Funds appropriated for such acquisition (and for transportation related to such acquisition) shall remain available for a period of five fiscal years, if so provided in appropriation Acts.

(b) Except for disposals made under the authority of paragraph (4) or (5) of section 6(a) or under section 7(a), no disposal may be made from the stockpile unless such disposal, including the quantity of the material to be disposed of, has been specifically authorized by law.

(c) There is authorized to be appropriated such sums as may be necessary to provide for the transportation, processing, refining, storage, security, maintenance, rotation, and disposal of materials contained in or acquired for the stockpile. Funds appropriated for such purposes shall remain available to carry out the purposes for which appropriated for a period of two fiscal years, if so provided in appropriation Acts.

STOCKPILE MANAGEMENT

SEC. 6. (a) The President shall–

(1) acquire the materials determined under section 3(a) to be strategic and critical materials;

(2) provide for the proper storage, security, and maintenance of materials in the stockpile;

(3) provide for the refining or processing of any material in the stockpile when necessary to convert such material into the form most suitable for storage and subsequent disposition;

(4) provide for the rotation of any material in the stockpile when necessary to prevent deterioration of such material by replacement of such material with an equivalent quantity of substantially the same material;

(5) subject to the notification required by subsection (d)(2), provide for the timely disposal of materials in the stockpile that (A) are excess to stockpile requirements, and (B) may cause a loss to the Government if allowed to deteriorate; and

(6) dispose of materials in the stockpile the disposal of which is specifically authorized by law.

(b) Except as provided in subsections (c) and (d), acquisition of strategic and critical materials under this Act shall be made in accordance with established Federal procurement practices, and, except as provided in subsections (c) and (d) and in section 7(a), disposal of materials from the stockpile shall be made by formal advertising or competitive negotiation procedures. To the maximum extent feasible–

(1) competitive procedures shall be used in the acquisition and disposal of such materials;

(2) efforts shall be made in the acquisition and disposal of such materials to avoid undue disruption of the usual markets of producers, processors, and consumers of such materials and to protect the United States against avoidable loss; and

(3) disposal of such materials shall be made for domestic consumption.

(c)(1) The President shall encourage the use of barter in the acquisition of strategic and critical materials for, and the disposal of materials from, the stockpile when acquisition of disposal by barter is authorized by law and is practical and in the best interest of the United States.

(2) Materials in the stockpile, the disposition of which is authorized by law, shall be available for transfer at fair market value as payment for expenses (including transportation and other incidental expenses) of acquisition of materials, or of refining, processing, or rotating materials, under this Act.

(3) To the extent otherwise authorized by law, property owned by the United States may be bartered for materials needed for the stockpile.

(d)(1) The President may waive the applicability of any provision of the first sentence of subsection (b) to any acquisition of material for, or disposal of material from, the stockpile. Whenever the President waives any such provision with respect to any such acquisition or disposal, or whenever the President determines that the application of paragraph (1), (2), or (3) of such subsection to a particular acquisition or disposal is not feasible, the President shall notify the Committees on Armed Services of the Senate and House of Representatives in writing of the proposed acquisition or disposal at least thirty days before any obligation of the United States is incurred in connection with such acquisition or disposal and shall include in such notification the reasons for not complying with any provision of such subsection.

(2) Materials in the stockpile may be disposed of under subsection (a)(5) only if the Committees on Armed Services of the Senate and House of Representatives are notified in writing of the proposed disposal at least thirty days before any obligation of the United States is incurred in connection with such disposal.

(e) The President may acquire leasehold interests in property, for periods not in excess of twenty years, for storage, security, and maintenance of materials in the stockpile.

SPECIAL DISPOSAL AUTHORITY OF THE PRESIDENT

SEC. 7. (a) Materials in the stockpile may be released for use, sale, or other disposition–

(1) on the order of the President, at any time the President determines the release of such materials is required for purposes of the national defense; and

(2) in time of war declared by the Congress or during a national emergency, on the order of any officer or employee of the United States designated by the President to have authority to issue disposal orders under this subsection, if such officer or employee determines that the release of such materials is required for purposes of the national defense.

(b) Any order issued under subsection (a) shall be promptly reported by the President, or by the officer or employee issuing such order, in writing, to the Committees on Armed Services of the Senate and House of Representatives.

MATERIALS DEVELOPMENT AND RESEARCH

SEC. 8. (a)(1) The President shall make scientific, technologic, and economic investigations concerning the development, mining, preparation, treatment, and utilization of ores and other mineral substances that (A) are found in the United States, or in its territories or possessions, (B) are essential to the national defense, industrial, and essential civilian needs of the United States, and (C) are found in known domestic sources in inadequate quantities or grades.

(2) Such investigations shall be carried out in order to–

(A) determine and develop new domestic sources of supply of such ores and mineral substances;

(B) devise new methods for the treatment and utilization of lower grade reserves of such ores and mineral substances; and

(C) develop substitutes for such essential ores and mineral products.

(3) Investigations under paragraph (1) may be carried out on public lands and, with the consent of the owner, on privately owned lands for the purpose of exploring and determining the extent and quality of deposits of such minerals, the most suitable methods of mining and beneficiating such minerals, and the cost at which the minerals or metals may be produced.

(b) The President shall make scientific, technologic, and economic investigations of the feasibility of developing domestic sources of supplies of any agricultural material or for using agricultural commodities for the manufacture of any material determined pursuant to section 3(a) of this Act to be a strategic and critical material or substitutes therefor.

NATIONAL DEFENSE STOCKPILE TRANSACTION FUND

SEC. 9. (a) There is established in the Treasury of the United States a separate fund to be known as the National Defense Stockpile Transaction Fund (hereinafter in this section referred to as the 'fund').

(b)(1) All moneys received from the sale of materials in the stockpile under paragraphs (5) and (6) of section 6(a) shall be covered into the fund. Such moneys shall remain in the fund until appropriated or until the end of the third fiscal year following the fiscal year in which they are received. Any such moneys remaining in the fund after the end of such third fiscal year that have not been appropriated shall be transferred to miscellaneous receipts of the Treasury. Any of such moneys that are appropriated shall be disbursed from the fund in the order in which they were covered into the fund.

(2) Moneys covered into the fund under paragraph (1) shall be available, when appropriated therefor, only for the acquisition of strategic and critical materials under section 6(a)(1) of this Act (and for transportation related to such acquisition).

(3) If so provided in appropriation Acts, moneys in the fund, when appropriated, shall remain available for a period of five fiscal years.

(c) All moneys received from the sale of materials being rotated under the provisions of section 6(a)(4) or disposed of under section 7(a) shall be covered into the fund and shall be available only for the acquisition of replacement materials.

ADVISORY COMMITTEES

SEC. 10. (a) The President may appoint advisory committees composed of individuals with expertise relating to materials in the stockpile or with expertise in stockpile management to advise the President with respect to the acquisition, transportation, processing, refining, storage, security, maintenance, rotation, and disposal of such materials under this Act.

(b) Each member of an advisory committee established under subsection (a) while serving on the business of the advisory committee away from such member's home or regular place of business shall be allowed travel expenses, including per diem in lieu of subsistence, as authorized by secion 5703 of title 5, United States Code, for persons intermittently employed in the Government service.

REPORTS TO CONGRESS

SEC. 11. The President shall submit to the Congress every six months a written report detailing operations under this Act. Each such report shall include–

(1) information with respect to foreign and domestic purchases of materials during the preceding six-month period;

(2) information with respect to the acquisition and disposal of materials under this Act by barter, as provided for in section 6(c) of this Act, during such period;

(3) a statement and explanation of the financial status of the National Defense Stockpile Transaction Fund and the anticipated appropriations to be made from the fund during the next fiscal year; and

(4) such other pertinent information on the administration of this Act as will enable the Congress to evaluate the effectiveness of the program provided for under this Act and to determine the need for additional legislation.

DEFINITIONS

SEC. 12. For the purposes of this Act:

(1) The term 'strategic and critical materials' means materials that (A) would be needed to supply the military, industrial, and essential civilian needs of the United States during a national emergency, and (B) are not found or produced in the United States in sufficient quantities to meet such need.

(2) The term 'national emergency' means a general declaration of emergency with respect to the national defense made by the President or by the Congress.

SEC. 13. Notwithstanding any other provision of law, on and after January 1, 1972, the President may not prohibit or regulate the importation into the United States of any material determined to be strategic and critical pursuant to the provisions of this Act, if such material is the product of any foreign country or area not listed as a Communist-dominated country or area in general headnote 3(d) of the Tariff Schedules of the United States (19 U.S.C. 1202), for so long as the importation into the United States of material of that kind which is the product of such Communist-dominated countries or areas is not prohibited by any provision of law.

NOTE:

The Strategic and Critical Materials Stock Piling Act was amended July 30, 1979 (93 Stat. 319 (50 U.S.C. 98 et seq.)) by replacing sections 1 through 9, redesignating section 10 as section 13, and repealing section 11. By Executive Order 12155 of September 10, 1979, the functions vested in the President by sections 3 and 11 are transferred to the Director of the Federal Emergency Management Agency. The functions in sections 6 and 10 are transferred to the Administrator of General Services; those in section 8 are transferred to the Secretary of the Interior and the Secretary of Agriculture.

APPENDIX 2

CALCULATION PROCEDURE FOR FAMILY GROUPINGS OF MATERIALS

The following example is designed to help the reader perform and understand the conversions and calculations used in preparing summary lines for basic family groupings. The purpose in using basic units for each of the families or groups of materials is to place the content of the primary material into a common denominator for easier comparison.

In time of emergency, there would be a need for a mix of various forms of each metal element. The stockpile goal for a metal is a mix of products at various stages of upgrading. The goal is calculated by examining expected wartime requirements, availability, and domestic capacity to produce each of the upgraded forms.

There is a different factor for converting each of the forms into a common denominator, usually the basic metal equivalent. The conversion factors are different because process conversion losses vary. The calculations and conversions used for beryllium metal group are shown as an example. The figures used do not reflect the current inventory quantities.

The beryllium metal group has a surplus of beryl ore (11%BeO) and shortfalls of beryllium copper master alloy (BCMA) and beryllium metal. Beryl ore is a raw material used in producing the other two products. The surplus of beryl ore is used to offset the shortfall of the upgraded forms, but in different proportions for each product because of the product composition and the accompanying processing loss.

Commodity	Unit	Goal	Total Inventory	Excess	Deficit
Beryllium Metal	**ST Be Metal**	**1,563**	**1,061**		**502**
11. *Beryl Ore (11% BeO)*	ST	0	17,986	0	0
12. *Beryllium Copper Master Alloy*	ST	16,710	7,387	0	0
13. *Beryllium Metal*	ST	895	229	0	502

PROCEDURE

1. Note that the available surplus of beryl ore is 17,986 ST.

2. Calculate the shortfall of BCMA.

16,710 ST Goal minus 7,387 ST inventory equals 9,323 ST shortfall.

3. Calculate the quantity of beryl ore required to offset 9,323 ST of BCMA.

9,323 ST BCMA times 1.3 equals 12,120 ST beryl ore.

4. Calculate the basic unit equivalent of the 9,323 ST of BCMA.

9,323 ST BCMA times 0.04 equals 373 ST beryllium metal.

5. Subtract the quantity of ore calculated to offset the shortfall of BCMA (3 above) from the total quantity of ore available (1 above).

17,986 ST ore minus 12,120 ST ore equals 5,866 ST of ore remaining.

6. The remaining quantity of surplus ore not used to cover the BCMA shortfall can now be used to offset part of the shortfall of beryllium metal. Convert the remaining ore to beryllium metal.

5,866 ST ore times 0.02801 equals 164 ST beryllium metal.

7. The total surplus beryl ore has been converted to the two upgraded forms, BCMA and beryllium metal, to cover the shortfall of these forms. The balance of excess ore is now zero.

12,120 ST ore converted to 9,323 ST BCMA

5,866 ST ore converted to 164 ST beryllium metal

Total 17,986 ST ore converted to BCMA and beryllium metal.

In converting the ore to beryllium metal, only one conversion was required. To convert the BCMA to the basic unit, i.e., beryllium metal, an additional conversion is needed. BCMA contains a nominal 4 percent beryllium metal. To convert the BCMA to beryllium metal, simply multiply 9,323 BCMA ST by .04 which equals 373 ST of beryllium metal.

The conversion to basic units is now complete.

12,120 ST ore to BCMA to beryllium metal equals 373 ST.

5,866 ST ore to beryllium metal equals 164 ST.

Total of 17,986 ST ore equals 537 ST beryllium metal.

EXAMPLE - BERYLLIUM METAL (ST)

	Beryl Ore (11% BeO)	Equivalent Basic Units
Excess to Goal	17,986	
Converted to Offset BCMA Shortfall (9,323 X 1.3)	-12,120	373
Balance	5,866	
Converted to Offset Beryllium Metal Shortfall (5,866 X 0.02801)	-5,866	164
Balance of Excess	0	
Total of Basic Units Offset		537

The balance of the family totals is shown in the table. Each of the forms of beryllium material has been converted to the basic beryllium metal units for easy subtraction and addition. Surplus material is shown as positive, shortfalls are shown as negative. The final balance for the family is 1,061 ST in inventory, 1,563 ST needed for the goal, leaving a shortfall of 502 ST beryllium metal.

Balance of Family Totals in Basic Units

	Inventory	Goal	Excess (+) Deficit (-)
Beryl Ore (11% BeO)	537	0	537
BCMA	295	668	-373
Beryllium Metal	229	895	-666
Total	1,061	1,563	-502

Factors Used for Converting Materials Into Family Groups

Materials	Unit	Multiple Factor	Basic Family Unit
Alumina	ST	0.518	Metal Equivalent, Aluminum
Aluminum Oxide, Fused, Crude	ST	0.85	Aluminum Oxide, Abrasive Grain
Bauxite, Metal Grade, Jamaica Type	ST	0.231	Metal Equivalent, Aluminum
Bauxite, Metal Grade, Surinam Type	ST	0.264	Metal Equivalent, Aluminum
Beryl Ore (11% BeO)	ST	0.028	Metal Equivalent, Beryllium
Beryllium Copper Master Alloy (4% Be)	ST	0.04	Metal Equivalent, Beryllium
Chromite, Chemical Grade Ore	ST	0.286	Metal Equivalent, Chromium
Chromite, Metallurgical Grade Ore	ST	0.286	Metal Equivalent, Chromium
Chromium, Ferro, High Carbon	ST	0.714	Metal Equivalent, Chromium
Chromium, Ferro, Low Carbon	ST	0.714	Metal Equivalent, Chromium
Chromium, Ferro, Silicon	ST	0.429	Metal Equivalent, Chromium
Columbium, Concentrates	LB	0.850	Metal Equivalent, Columbium
Diamond Dies, Small	PC	0.50	Carat
Manganese, Dioxide, Battery Grade	SDT	1.000	Manganese, Dioxide, Battery Grade, Synthetic
Manganese, Chemical Grade	ST	0.400	Metal Equivalent, Manganese
Manganese, Metallurgical Grade	ST	0.400	Metal Equivalent, Manganese
Manganese, Ferro, High Carbon	ST	0.800	Metal Equivalent, Manganese
Manganese, Ferro, Medium Carbon	ST	0.800	Metal Equivalent, Manganese
Manganese, Ferro, Silicon	ST	0.720	Metal Equivalent, Manganese
Opium Gum	AMA LB	1.000	Opium Salts
Tantalum Minerals	LB	0.85	Metal Equivalent, Tantalum
Tungsten Ores and Concentrates	LB	0.851	Metal Equivalent, Tungsten

APPENDIX 3

PRESS RELEASE - 1980 STOCKPILE GOALS

1980's Stockpile Goals Set by Federal Emergency Management Agency

WASHINGTON, D.C.–The Office of Plans and Preparedness, the Federal Emergency Management Agency (FEMA) office which has the responsibility for developing policy guidelines for stockpiling strategic materials in the United States, announced today an update of the stockpile goals for the materials making up the National Defense Stockpile.

The materials in the stockpile are insurance against dangerous and costly dependence of foreign sources during a period of extended national emergency. The stockpile assures that adequate supplies of strategic and critical materials would be on hand for the Nation's industry to produce increased amounts of essential items.

Frank A. Camm, Associate Director for the agency, said that President Carter's policy guidance on stockpiling calls for FEMA to make periodic review of the stockpile goals and to revise those goals whenever it is appropriate.

"That review," Camm said, "also had to comply with the new Strategic and Critical Materials Stock Piling Act of 1979, which requires the stockpile to be sufficient '. . .to sustain the United States for a period of not less than 3 years in the event of a national emergency'."

Camm noted that there has been no fundamental change in the policy guidance for the stockpile as announced in 1976 when the previous goals were established.

Camm said that this update resulted in setting the new stockpiling goals for 1980 at a total value of $18.7 billion.

Comparing 1980 goals with the 1976 goals (using December 31, 1979 prices) the value of the new goals is approximately 1.5 percent higher than the $18.5 billion 1976 goals, or a $273 million increase.

Camm also said that FEMA coordinated an extended interagency effort that resulted in major improvements in the calculation of stockpile goals. Those improvements were reflected in the methods used for setting the 1980 stockpile goals in this review:

- All data on technology trends and the availability of foreign and domestic supplies of materials were updated, as were the macroeconomic models used to simulate wartime economic activity.

- Stockpile materials that are various forms of a single element were combined into groups or families.

- A new method was used in calculating goals for upgraded forms of basic stockpile materials. The method calculated requirements against anticipated supply and domestic production capacity form by form on a year-by-year basis.

All goals have been rounded to emphasize they are targets affected by changing conditions rather than precisely fixed quantities of materials.

"A number of changes have been made in the quantities of the various goals," Camm said. "I want to emphasize that these goals are not planned commitments to buy or sell spe-

cific quantities of materials. Rather, they identify the magnitude of raw materials vulnerabilities of the United States during the war."

These vulnerabilities may be reduced by stockpile purchases or by other alternative programs, such as the expansion of domestic capacity.

The stockpile consists of 62 groups or individual commodities of industrial materials stored at 113 locations in the U.S. Most of the materials in the stockpile were acquired prior to 1959.

A new material has been added to the stockpile list–abrasive grade bauxite. A material has been eliminated as no longer strategic and critical: shellac. One material, graphite (natural, other than from Ceylon and Malagasy), has been redefined.

For common industrial materials, such as chromium, manganese, copper, fluorspar, nickel, and zinc, minor changes in the goals reflect a growing U.S. economy and shifts in the supply picture. The exotic aerospace materials, cobalt and titanium, illustrate how FEMA takes into account the complex interactions between requirements and supply.

The goals for titanium metal sponge show a large increase from about 130,000 to 195,000 tons. Titanium is a critical material used in jet engines and in structural components in high performance aircraft. The stockpile goal is largely dependent on the level of defense purchases of aircraft and the limited domestic capacity to produce titanium sponge.

On the other hand, the stockpile goals for cobalt remain unchanged. Offsetting increased defense requirements are increased opportunities for substitution in non-critical applications and increased North American production of cobalt metal.

TABLE 4

National Defense Stockpile Goals, April 1980

*The values appearing in parentheses immediately following the material name are the logical units of rounding, i.e. (10,000) means the goal has been rounded to the nearest 10,000 units.

Commodity	Unit	GOAL Old	GOAL New*	Reasons For Change
Aluminum Metal Group (10,000)	ST Al	6,095,849	7,150,000	The size and makeup of the Aluminum goal have been changed due to: (1) Changes in the supply of alumina (2) Reassessment of domestic primary supply (3) New evaluation of domestic secondary supply (4) More precise definition of requirements, capacities and conversions.
Aluminum Oxide, Abrasive Grade (1,000)	ST OF Abrasive Grain	200,472	638,000	Aluminum Oxide: A new category has been established to cover the Abrasive Grade Bauxite
Antimony (1,000)	ST	20,130	36,000	Sharp drop in secondary supply from batteries.
Asbestos, Amosite (1,000)	ST	26,291	17,000	Long term substitutes and decreasing requirements.
Asbestos, Chrysotile (100)	ST	0	3,000	Contingency goal established pending special review of defense needs.

Commodity	Unit	GOAL Old	GOAL New*	Reasons For Change
Bauxite, Refractory (100,000)	LCT	2,083,000	1,400,000	Reevaluation of data indicated reduced requirements.
Beryllium Metal Group (10)	ST Be Metal	1,563	1,220	Reduced requirements.
Bismuth (100,000)	LB	771,000	2,200,000	Increased requirements plus decreased supply.
Cadmium (100,000)	LB	24,701,000	11,700,000	Decline in requirements.
Castor Oil Group (1,000,000)	LB	0	22,000,000	U.S. no longer produces castor beans. Wartime supply drastically reduced.
Chromium, Chemical and Metallurgical Group (1,000)	ST Cr Metal	1,235,865	1,353,000	Chromium Group: Overall increase in requirements and new data.
Chromite, Refractory Grade Ore (10,000)	SDT	642,000	850,000	Limited Supply.
Cobalt (100,000)	LB Co	85,415,000	85,400,000	Change less than 10%.
Columbium Metal Group (10,000)	LB Cb Metal	2,661,350	4,850,000	Production capacity limitations and sharply increased consumption.
Copper (100,000)	ST	1,299,000	1,000,000	Reduction in estimated requirements.
Cordage Fibers, Abaca (1,000,000)	LB	24,000,000	155,000,000	Sharply reduced supply.

Commodity	Unit	GOAL Old	New*	Reasons For Change
Cordage Fibers, Sisal (1,000,000)	LB	114,000,000	60,000,000	Large increase in available supply.
Diamond, Industrial Group (100,000)	KT	20,533,000	29,700,000	New uses, increased consumptions and consequently increased requirements. Combines diamond bort, stones, and dies.
Feathers and Down (100,000)	LB	6,494,000	1,500,000	Increased substitutions by synthetics.
Fluorspar, Acid Grade (100,000)	SDT	1,594,000	1,400,000	Special adjustment to reflect Aluminum usage.
Fluorspar, Metallurgical Grade (100,000)	SDT	1,914,000	1,700,000	Reduced requirements.
Graphite, Natural-Ceylon, Amorphous Lump (100)	ST	6,271	6,300	No change.
Graphite, Natural - Malagasy Crystalline (1,000)	ST	20,472	20,000	No change.
Graphite, Natural - Other than Ceylon and Malagasy (100)	ST	34,748	2,800	Updated data series - change in definition.
Iodine (100,000)	LB	3,333,000	5,800,000	Increased consumption.
Jewel Bearings (1,000,000)	PC	224,623,000	120,000,000	Declining requirements for watch bearings.

Commodity	Unit	GOAL Old	GOAL New*	Reasons For Change
Lead (100,000)	ST	865,000	1,100,000	Increase in requirements exceeds increases in supply.
Manganese Dioxide, Battery Grade (1,000)	SDT	31,841	87,000	Increased demand for battery operated devices and high performance batteries. Sharply reduced supply.
Manganese, Chemical and Metallurgical Group (10,000)	ST Mn Metal	1,423,374	1,500,000	Manganese Group: New goal results of new data and rounding.
Mercury (100)	FL	54,004	10,500	Substantial increase in domestic production.
Mica, Muscovite Block, Stained and Better (100,000)	LB	6,188,000	6,200,000	All mica goals remain unchanged. Pending completion of Department of Commerce study.
Mica, Muscovite Film, First and Second Qualities (1,000)	LB	90,000	90,000	All mica goals remain unchanged. Pending completion of Department of Commerce study.
Mica, Muscovite Splittings (10,000)	LB	12,631,000	12,630,000	All mica goals remain unchanged. Pending completion of Department of Commerce study.
Mica, Phlogopite Block (10,000)	LB	206,064	210,000	All mica goals remain unchanged. Pending completion of Department of Commerce study.

Commodity	Unit	Old	New*	Reasons For Change
Mica, Phlogopite Splittings (10,000)	LB	932,000	930,000	All mica goals remain unchanged. Pending completion of Department of Commerce study.
Molybdenum Group (1,000)	LB Mo	0	0	No change.
Nickel (10,000)	ST Ni + Co	204,335	200,000	No change (less than 10%).
Opium Group (10,000)	AMA LB	75,000	130,000	Reanalysis of nuclear requirements.
Platinum Group Metals, Iridium (1,000)	TrOz	97,761	98,000	No change-rounding.
Platinum Group Metals, Palladium (100,000)	TrOz	2,450,000	3,000,000	Reduced supply.
Platinum Group Metals, Platinum (10,000)	TrOz	1,314,000	1,310,000	No change-rounding (less than 10%).
Pyrethrum (100,000)	LB	377,851	500,000	Increased defense requirements.
Quartz Crystals (10,000)	LB	0	600,000	Provisional goal for critical defense communication applications.
Quinidine (100,000)	AV Oz	6,841,000	10,100,000	New calculations based on population needs.

Commodity	Unit	GOAL Old	New*	Reasons For Change
Quinine (100,000)	AV Oz	3,045,000	4,500,000	Increased requirements.
Rubber (10,000)	LT	513,134	850,000	Reduction of supply.
Rutile (1,000)	SDT	173,928	106,000	Requirements declined for applications except titanium metal.
Sapphire and Ruby (1,000)	KT	0	0	No change.
Shellac	LB	8,529,000	0	No longer a strategic and critical material.
Silicon Carbide, Crude (1,000)	ST	306,628	29,000	Increased domestic capacity.
Silver (fine) (10,000)	TrOz	0	0	No change.
Talc, Steatite Block and Lump (1)	ST	104	28	Declining consumption and increased substitutions.
Tantalum Metal Group (5,000)	LB Ta Metal	7,159,339	7,160,000	Tantalum Group: Slight increase due to increased requirements. Not greater than 10 percent.
Thorium Nitrate (100,000)	LB	1,800,000	600,000	Declining consumption and increased substitution.
Tin (1,000)	LT	32,499	42,000	Reduced domestic secondary supply.

Commodity	Unit	GOAL Old	New*	Reasons For Change
Titanium Sponge (5,000)	ST	131,503	195,000	Increased requirements plus capacity limitations.
Tungsten Metal Group (1,000)	LB W Metal	41,412,936	50,666,000	Tungsten Group: Overall increase due to increased defense requirements.
Vanadium Group (100)	ST V Metal	12,671	8,700	Increased domestic capacity.
Vegetable Tannin Extract, Chestnut (1,000)	LT	6,942	5,000	Declining consumption has reduced requirements.
Vegetable Tannin Extract, Quebracho (1,000)	LT	37,998	28,000	Declining consumption reduced requirements.
Vegetable Tannin Extract, Wattle (1,000)	LT	20,208	15,000	Increased available supply.
Zinc (25,000)	ST	1,313,000	1,425,000	Loss of large domestic producer.

TABLE 5

Desired Inventory Mix For Stockpile Groups

*The values appearing in parentheses immediately following the material name are the logical units of rounding, i.e. (10,000) means the goal has been rounded to the nearest 10,000 units.

Commodity	Unit	Desired Inventory Mix*
Aluminum Metal Group	ST AL	7,150,000
Alumina (100,000)	ST	0
Aluminum (100,000)	ST	700,000
Bauxite, Metal Grade, Jamaica Type (1,000,000)	LDT	21,000,000
Bauxite, Metal Grade, Surinam Type (100,000)	LDT	6,100,000
Aluminum Oxide, Abrasive Grade Group	ST. Of Abrasive Grain	638,000
Aluminum Oxide, Abrasive Grain (1,000)	ST	0
Aluminum Oxide, Fused, Crude (1,000)	ST	0
Bauxite, Abrasive, Grade (10,000)	LCT	750,000
Beryllium Metal Group	ST. Be Metal	1,220
Beryl Ore (11% BEO) (1,000)	ST	18,000
Beryllium Copper Master Alloy (100)	ST	7,900
Beryllium Metal (100)	ST	400

Commodity	Unit	Desired Inventory Mix*
Chromium, Chemical and Metallurgical Grade, Group	ST. Cr Metal	1,353,000
Chromite, Chemical Grade Ore (1,000)	SDT	675,000
Chromite, Metallurgical Grade Ore (100,000)	SDT	3,200,000
Chromium, Ferro, High Carbon (1,000)	ST	185,000
Chromium, Ferro, Low Carbon (1,000)	ST	75,000
Chromium, Ferro, Silicon (10,000)	ST	90,000
Chromium, Metal (1,000)	ST	20,000
Columbium Group	LB Cb Metal	4,850,000
Columbium Carbide Powder (10,000)	LB Cb	100,000
Columbium Concentrates (100,000)	LB Cb	5,600,000
Columbium, Ferro (10,000)	LB Cb	0
Columbium, Metal (10,000)	LB Cb	0
Diamond, Industrial Group	KT	29,700,000
Diamond Dies, Small (10,000)	PC	60,000
Diamond, Industrial, Crushing Bort (1,000,000)	KT	22,000,000
Diamond, Industrial, Stones (100,000)	KT	7,700,000
Manganese, Dioxide Battery Grade Group	SDT	87,000
Manganese, Battery Grade, Natural Ore (1,000)	SDT	62,000
Manganese, Battery Grade, Synthetic Dioxide (1,000)	SDT	25,000
Manganese, Chemical and Metallurgical Grade, Group	ST. Mn Metal	1,500,000
Manganese Ore, Chemical Grade (10,000)	SDT	170,000
Manganese Ore, Metallurgical Grade (100,000)	SDT	2,700,000
Manganese, Ferro, High Carbon (1,000)	ST	439,000

Commodity	Unit	Desired Inventory Mix*
Manganese, Ferro, Low Carbon (1,000)	ST	0
Manganese, Ferro, Medium Carbon (1,000)	ST	0
Manganese, Ferro, Silicon (1,000)	ST	0
Manganese Metal, Electrolytic (1,000)	ST	0
Molybdenum Group	LB Mo	0
Molybdenum Disulphide (10,000)	LB Mo	0
Molybdenum, Ferro (10,000)	LB Mo	0
Opium	AMA LB	130,000
Opium, Gum (10,000)	AMA LB	0
Opium, Salt (10,000)	AMA LB	130,000
Tantalum Metal Group	LB Ta Metal	7,160,000
Tantalum, Carbide Powder (10,000)	LB Ta	0
Tantalum Metal (10,000)	LB Ta	0
Tantalum Minerals (100,000)	LB Ta	8,400,000
Tungsten Metal Group	LB W Metal	50,666,000
Tungsten Carbide Powder (100,000)	LB W	2,000,000
Tungsten, Ferro (100,000)	LB W	0
Tungsten, Metal Powder (100,000)	LB W	1,600,000
Tungsten Ores and Concentrates (10,000)	LB W	55,450,000
Vanadium Group	ST V Metal	8,700
Vanadium, Ferro (100)	ST V	1,000
Vanadium Pentoxide (100)	ST V	7,700

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